

ON A COLLECTION OF BLATTIDAE FROM THE BUITENZORG MUSEUM

by

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(Oxford Museum).

The following pages contain a list of the Blattidae in the Buitenzorg Museum which Dr. KARNY sent me in April of last year (1921). The collection, though embracing practically the whole of the Dutch East Indies, from Sumatra to New Guinea, and thus including two of Wallace's sub-regions, the Malayan and the Austro-Malayan, is by no means exhaustive. It consists of about 42 species, six of which I venture to describe as new. Since the Malayan sub-region alone is known to contain nearly 200 species of Blattidae, there is yet ample scope for future collectors. All the sub-families are represented in the collection, with the exception, of course, of the Nyctiborinae and Blaberinae which are restricted to the New World.

As my paper on "Malayan Blattidae" (Journal No. 69, Straits Branch, Royal Asiatic Society, pp. 17-178, 7 pls., 1915) covers the greater part of the ground of the Buitenzorg collection, I must refer to it for detailed descriptions, synonyms and data of distribution of the more common forms, and to lists of literature.

I undertook this work in the Hope Department of the University Museum, Oxford, and the following pages will therefore repeatedly contain references to the excellent collection of Blattidae which was worked out and arranged by the late Mr. R. SHELFORD. To Professor POULTON, F. R. S., who most kindly permitted me to do so and allowed me all facilities of his Department, I tender herewith my sincerest thanks. I am also much indebted to Mr. A. ROBINSON, of the Museum here, for preparing an enlarged photograph of *Phyllodromia diagrammatica*, n. sp.

The collection had suffered somewhat in transit from Java to Europe by a number of specimens becoming loose. This will explain why the descriptions frequently contain the words "without locality label".

Subfamily ECTOBINÆ.

•*Hemithyrsocera histrio*, BURMEISTER.

1 ♀, Gunung Salak, Java (Dec. 1900).

1 ♀, Soekaboemi, Java (March 1914).

1 ♀, Buitenzorg (KARNY, Nov. 1920).

1 ♂, Meloewoeng, Tjilatjap, M. Java, 1915.

Distribution: Malay Peninsula; Sumatra; Java; Borneo; Celebes.

Subfamily PHYLLODROMIINÆ. ¹⁾

Phyllodromia notulata, STÅL.

1 ♂, 1 ♀ Buitenzorg (KARNY, Sept. 1920).

Distribution: Malay Peninsula; Java; Borneo; Tahiti.

Phyllodromia germanica, L.

1 ♂, Buitenzorg (August. 1920).

1 ♀, Purmerend, Bay of Batavia (DAMMERMAN, Nov. 1919).

Distribution: cosmopolitan.

Phyllodromia contingens, WALKER.

1 ♂, Buitenzorg (1920).

1 ♂, Enkhuizen, Bay of Batavia (DAMMERMAN, 1919).

1 ♂, 4 ♀♀, Krakatau (DAMMERMAN 1919 and 1920).

This species is now for the first recorded from Java, having been known before only from Singapore and Borneo. The Oxford University Museum ²⁾ contains Walker's types of his *Blatta contingens* ♀, from Sarawak, and the synonymous *Blatta humeralis* ♂, from Singapore, both collected by Wallace; also specimens from Kuching, Sarawak, taken by SHELFORD.

Distribution: Singapore; Borneo; Java.

Phyllodromia latius vittata, BRUNNER VON WATTENWYL.

2 ♀♀ Buitenzorg (KARNY 1920).

One of the specimens with egg case.

Curiously enough, Brunner's type came from Buitenzorg too, but the species has since been taken on Singapore island, by Prof. C. F. BAKER, and the O. U. M. has an example from Macassar (M. Burr collection).

Distribution: Singapore; Java; Celebes.

Phyllodromia diagrammatica, n. sp.

As the single specimen (♀) I received from the Buitenzorg Museum, had lost its locality label, it is fortunate that I have three other examples of the same species before me which were recently sent to me from the

¹⁾ As in my previous paper, I continue to use the generic name *Phyllodromia* Serville, instead of adopting the name *Blattella*, suggested by A. N. CAUDELL in 1903 (Proc. Entom. Soc. Washington, Vol. V; p. 232). Though the former name, being pre-occupied by a Dipterous genus, will finally have to be abandoned, yet little is gained by a change before this unwieldy genus of which SHELFORD, in "Genera Insectorum" enumerates 185 species, has been broken up, either on the lines proposed by SHELFORD, or in some other way. See Shelford's "Preliminary Diagnoses of some new genera of Blattidae", in Entom. Monthly Mag. (2), Vol. XXII. (1911), pp. 154—156.

²⁾ Subsequently referred to as O. U. M.

Raffles Museum, Singapore. Two of them had been collected by Mr. C. BODEN KLOSS in Kuala Lumpur, Federated Malay States, in January & February 1918 respectively, and the third, from Selitar, Singapore, was taken by Mr. F. MONTEIRO, February 13th 1918. The following description refers to the first of these three specimens, from Kuala Lumpur.

Head free. Epicranium red; eyes, clypeus, labrum and mouth parts generally black. Antennae setaceous. Pronotum black, with a narrow white border all round; near its centre two white comma-like markings each of which is enclosed in front by a white hook-like line. Tegmina ¹⁾ black at the base, turning greyish-brown towards the tips, with all the veins chalk-white, clearly standing out against the dark back ground. Radial vein with 12 costal veins; the first eight simple, the 9th bifurcated, the 10th trifurcated, the 11th and 12th simple. Ulnar vein sending 7 branches towards the sutural margin, of which the 4th and 5th are bifurcated, the others simple. Anal area with 5 axillary veins.

Wings transparent, with the anterior margin infuscated. Mediastinal vein simple, proximally fused with the radial vein. Radial vein bifurcated, with 3 or 4 anastomoses between the two branches; outer branch with 4 or 5 costals; inner branch with 10 to 12 costals which may arise singly, or multiramose, i.e. 3 to 5 branches from a common trunk. Costals all incrassated. Median vein simple or bifurcated. Ulnar vein sending 3 or 4 branches to the apex only, of which the last branch is bifurcated, the others simple; apex of Ulnar vein bifurcated. Small apical field. First axillary vein 4-ramose. Front femora armed with about 3 strong spines, succeeded distally by a close-set row of minute piliform spines (the proximal portion of the front femora being almost free of spines).

Total length 12 mm; body 8.5 mm; tegmina 10 mm; pronotum 2.5 × 3.7 mm.

In the specimen examined right and left wing differ in their venation. The first 4 costals of the left wing spring from the outer branch of the radial; these are followed by 3 costals arising singly from the inner branch of the radial, then by 5 costals from a common trunk, and finally by 3 costals, also from one trunk. In the right wing we find 5 costals arising from the outer radial, followed by three groups of 4, again 4, & 2 costals respectively, springing in common trunks from the inner radial. More curious is that the median vein of the left wing is simple, that of the right wing

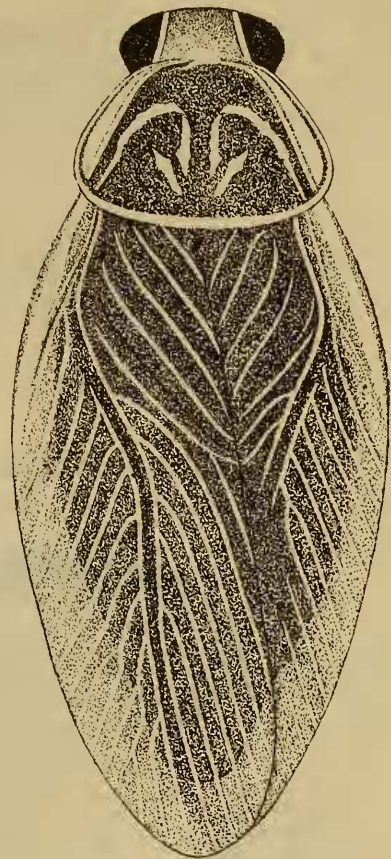


Fig. 1. *Phyllodromia diagrammatica* n. sp. $7\frac{1}{2} \times$.

¹⁾ Both pronotum and tegmina of the Buitenzorg example are brown. This is possibly merely due to fadicy, unless the specimen should represent a local variety.

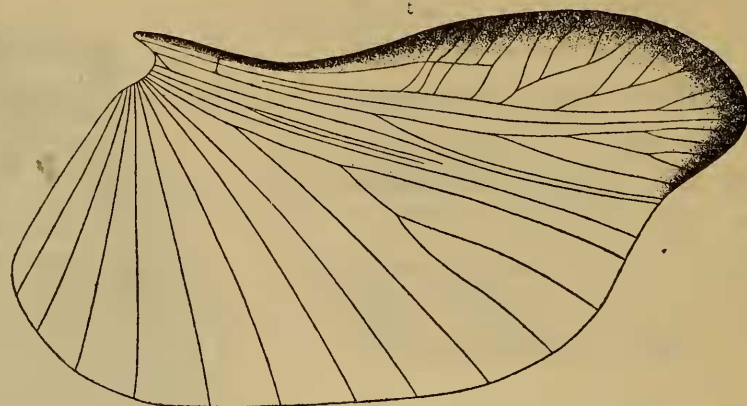


Fig. 2. *Phyllodromia diagrammatica*, n. sp. Right wing.

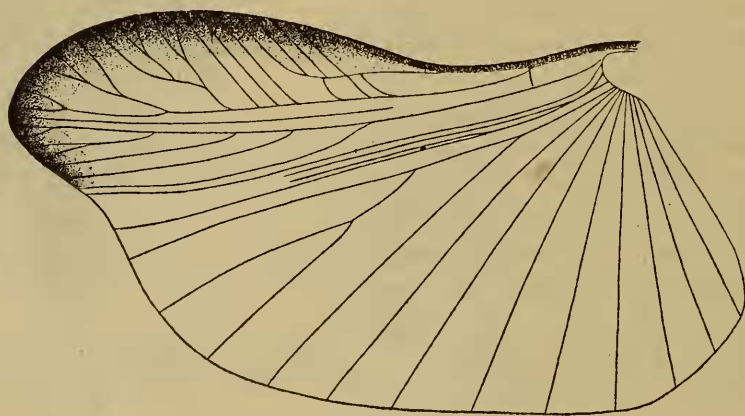


Fig. 3. *Phyllodromia diagrammatica*, n. sp. Left wing.

bifurcated. Considering that e. g. a forked median vein is one of the characters of *Ellipsoidion*, Saussure (= *Apolyta* Brunner) to distinguish it from allied genera with simple veins, it shows with what caution such-like differences must be employed for generic distinction. Finally the ulnar vein of the left wing gives off 5 branches, of which the 4th is bifurcated, the others simple; the right ulnar has 4 branches, of which the third is bifurcated, the others simple.

The armature of the front femora conforms with Shelford's type "B", in his "Preliminary Diagnose of some new genera of Blattidae" ¹⁾ where he proposes to split up *Phyllodromia*, Serville into six genera. This, together with the ramose character of the ulnar vein of the wings and the only slight development of the apical triangle, would bring this species under the genus *Eoblatta*, Shelford, of which *Blatta notulata*, Stål, is the type.

Phyllodromia sp.

1 ♀, immature, Buitenzorg (October 1920).

Antennae setaceous, long, about 12 mm., light at their bases, dark at their tips. Pronotum shining black, with a border of transparent light brown, narrow in front.

¹⁾ Entom. Mo. Mag. (2), Vol. XXII, pp. 154—156 (1911).

wider at the sides, broadest behind. Mesonotum with a large black saddle-shaped blotch, leaving a crescent-shaped transparent light-coloured margin in front, and broad irregular margins at the sides. Metanotum transparent light brown, with a few dark blotches along its posterior border. Abdomen mottled light and dark. Legs light-coloured, transparent, with black blotches at the joints, and small black spots at the bases of the spines. Tegmina and wings not yet developed.

Length 10 mm; width 5 mm.

The O. U. M. contains two exactly similar specimens, also immature, not named, from the Botanic Gardens, Singapore, collected by Mr. RIDLEY in 1906.

***Ellipsoidion terminale*, n. sp.**

1 ♀, Merauke, New Guinea (1904).

As the specimen in question is slightly damaged, the following description is taken from an exactly similar example, ♂, unnamed, in the O. U. M., labelled "Purchased from Mr. EXTON, New Guinea, 1.7.1891" "Presented 1907 by the National Museum, Victoria".

Vertex of head orange, remainder black. Basal half of the antennae hirsute, black; distal half setaceous, orange. Pronotum orange. Tegmina orange, with the exception of their tips, their inner margins, and the basal portion of the anal area, which are black. Abdominal sterna cream-white at their lateral edges and along the central portion of their posterior margins; otherwise shining black. Coxae black; femora orange, their distal ends black; tibiae orange; tarsi black.

Total length 14 mm; body 9.5 mm; pronotum 3.5 × 5 mm; tegmina 11 mm.

This species is closely allied to *E. aurantium*, Sauss.¹⁾ from Australia, which, however, differs from *E. terminale* by the basal portion and the inner margins of the tegmina being orange, instead of black, and by the lateral white borders of the abdominal sterna being continuous with the white borders of their posterior margins.

This is apparently only the second species of *Ellipsoidion* so far described from New Guinea the other being *E. castaneum*, Shelford, A.M.N.H. (7), Vol. XIX, p. 28 (1907), the genus being typically Australian.

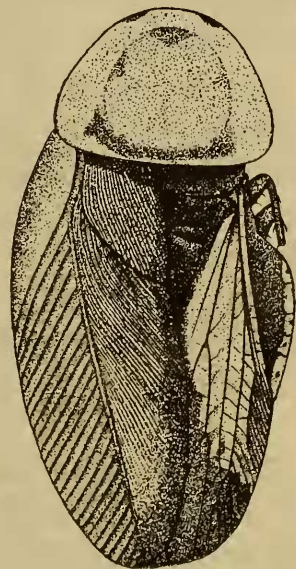


Fig. 4. *Ellipsoidion terminale*, n. sp. 4 ×.

Subfamily EPILAMPRINAE.

***Homalopteryx adusta*, WALKER.**

1 ♂, Edam, Bay of Batavia (DAMMERMAN, November 1920).

This species, having originally been described from Sarawak (Wallace's collection) is now for the first time recorded from Java. Besides

¹⁾ Rev. Zool. (2), Vol. XVI, p. 312 (1864).

Walker's type (♀), there is in the O. U. M. an example (♀) from Kuching, Sarawak (Shelford, 1900). The measurements of the Java specimen slightly exceed those given by Shelford (Trans. Entom. Soc., London, 1906, p. 497, pl. XXX, fig 6), viz:

Java specimen, ♂: total length 26 mm; tegmina 19 mm; pronotum 8.5×12 mm;

Sarawak specimen, ♀: total length 23 mm; tegmina 17 mm; pronotum 8.5×12 mm.

Homalopteryx macassariensis, DE HAAN.

Epilampra macassariensis, DE HAAN. Temminck, Verhand. Orth., p. 51, pl. XVIII, fig. 7 (1842).

Homalopteryx macassariensis, BRUNNER. Syst. Blatt. p. 197 (1865).

Epilampra basifera, WALKER. Cat. Blatt. Brit. Mus. Suppl. p. 132 (1869).

Epilampra strigifrons, WALKER. ibid. p. 132 (1869).

Homalopteryx macassariensis, KIRBY. Syn. Cat. Orth., Vol. I, p. 115 (1904).

Homalopteryx macassariensis, SHELFORD. Gen. Ins., fasc 101, p. 8, pl. I, fig. 10, (1910).

1 ♀, Ceram.

Total length 33 mm; body 31 mm; tegmina 22 mm; tegmina transv. 11 mm; pronotum 9.5×14 mm.

This agrees well with BRUNNER's measurements, also for a ♀: body 32 mm; tegmina 23 mm; tegmina transv. 11.5 mm; pronotum 9.5 mm.

Whilst the tegmina of the ♀ reach only to the base of the supra-anal lamina, those of the ♂ slightly exceed the abdomen, as seen in the type, ♂, of *E. basifera*, Walker, from Ceram, in the O.U.M. The measurements of the latter are:

Total length 29.5 mm; body 23 mm; tegmina 21 mm; tegmina transv. 9.5 mm; pronotum 8.5×12 mm.

Distribution: Philippines; Macassar, Celebes; Amboina; Ceram.

Compsolampra liturata, SERVILLE.

1 ♂ without locality label;

1 ♀ Tjibodas, West Java (August 1913).

This curious species, with its short, quadrate tegmina not extending beyond the first abdominal tergite, was originally described from Java. Saussure ¹⁾ recorded it subsequently from China as well as from Java, under the name of *Epilampra quadrata*, and Shelford ²⁾ from Kandy, Ceylon, though he omits that locality in "Genera Insectorum", fasc. 101, p. 6 (1910). The two specimens from the Buitenzorg Museum agree well in their dimensions with those given by Brunner ³⁾ of material which also came from Java, and with those by Saussure, viz:

¹⁾ Mém. Soc. Genève, Vol. XXIII, p. 129 (1873).

²⁾ Jahrb. Nassau. Ver. Naturk. Wiesbaden, Vol. LXI, p. 27 (1908).

³⁾ Syst. Blatt. p. 201 (1865).

	Buitenzorg Museum		Brunner coll.		Saussure coll.	
	♂ mm.	♀ mm.	♂ mm.	♀ mm.	♂ mm.	♀ mm.
body	19.5	26.5	19.—	24.—	20.—	25.—
pronotum, long	7.—	7.—	6.—	7.—	5.7	7.6
pronotum, lat.	8.5	9.—	7.5	9.—	7.2	10.—
tegmina	6.—	5.—	5.5	4.5	5.7	5.6

The specimens in the O.U.M. all came from Java too.

***Pseudophoraspis nebulosa* BURMEISTER.**

1 ♀ Buitenzorg (Dec. 1919);

4 ♀♀ without locality label.

This species shows a remarkable variation both in size and colouring, especially amongst the ♀♀. A series of about 50 specimens in the O.U.M. shows that the ♀♀ vary from 26.5 to 45 mm. in total length, the ♂♂ from 33 to 41 mm. The ♀♀ which are always much more convex than the ♂♂, may be ashy grey, amber-coloured, or testaceous, with or without dark brown or black spots and vermiculations, whilst amongst the ♂♂ amber colour predominates. The smallest ♀ in the O.U.M., 26.5 mm. in total length, came from Pengalengan, W. Java, 4000' (1893).

This is a common Malayan species, having been recorded from the Malay Peninsula, Singapore, Sumatra & Borneo, and there is a long series from Kalim Bungo, M. Nias, (R. Mitschke, 1896) in the O.U.M. — A single specimen, ♀, taken by Meade Waldo in Colombo, in 1908, would almost seem to have been an accidental importation.

***Rhabdoblatta procera*, BRUNNER VON WATTENWYL.**

2 ♂♂ Buitenzorg (KARNY, Oct. & Nov. 1920).

2 ♀♀ without locality label.

The O.U.M. has 1 ♂ & 2 ♀♀ from Pontianak, Dutch Borneo (Andre); 2 ♀♀ from Kalim Bungo, M. Nias (Mitschke, 1896); 1 ♀ from Balabac, off Borneo (Staudinger & Bang-Haas, 1908); 1 ♀ from Fort de Kock, Sumatra (A. de Bormans).

Having originally been described from Java only, Borneo & Sumatra are therefore new records. The species varies considerably in size, as the following table shows:

	♂ Buitenzorg	♂ Pontianak (O. U. M.)	♀ Java (Brunner)	♀ Pontianak (O. U. M.)
total length	31 mm.	27 mm.	? mm.	40 mm.
body	25 mm.	18 mm.	37 mm.	27 mm.
pronotum	6.5 × 8 mm.	5 × 6.5 mm.	8.5 × 10 mm.	8 × 10 mm.
tegmina	27 mm.	22 mm.	40 mm.	33.5 mm.

***Epilampra circumdata*, HANITSCH.**

Journal, Straits Branch, R. Asiatic Soc., No. 69, p. 84, pl. 1, fig. 5 (1915).

2 ♀♀, Borneo (1912);

1 ♀ without locality label.

I described this species first from specimens from Singapore & the Malay Peninsula, so that Borneo is a new locality. The O. U. M. contains an unnamed example ♀ from Saribas, Borneo (R. Shelford, Nov. 1900). All the Bornean specimens ♀♀ are somewhat larger than the type ♀, viz. total length 36.5 mm; pronotum 8×10.5 mm; tegmina 29 mm; against 33 mm; 7×9 mm; 27.5 mm. respectively. But the Buitenzorg Museum collection also contains a fourth example, ♀, unfortunately without locality, which in size much exceeds the other specimens, unless it should be the type of a new species, viz. total length 45 mm; pronotum 10×13 mm; tegmina 35 mm.

***Epilampra keraudrenii*, LE GUILLOU.**

Blatta keraudrenii, LE GUILLOU. Rev. Zool. 1841, p. 292.

Epilampra keraudrenii, BRUNNER. Syst. Blatt. p. 182 (1865).

Heterolampra keraudrenii, KIRBY. Syn. Cat. Orth. Vol. I, p. 122 (1904).

Epilampra keraudrenii, SHELFORD. Gen. Ins. fasc. 101, p. 15 (1910).

1 ♂ Pionierbivak near Mamberano, North New Guinea (15.3. 1914).

1 ♂, 1 ♀ New Guinea (ter Poorten).

1 ♀ New Guinea (Gjellerup, 1911).

1 ♀ Djampang, Soekaboemi, West Java (May 1917).

This species is now for the first time recorded from outside New Guinea.

The average dimensions of the above specimens are:

♂: total length 34 mm; body 28 mm;

pronotum 5.5×9 mm; tegmina 30 mm;

♀ total length 38 mm; body 32 mm;

pronotum 8×11 mm; tegmina 32 mm.

A ♀ specimen in the O.U.M., from German New Guinea (Staudinger & Bang-Haas, 1908) is very slightly larger, viz:

♀ total length 40 mm; body 32 mm;

pronotum 9×12 mm; tegmina 33 mm.

***Epilampra angusta*, n. sp.**

1 ♀, Tjibodas, Java (January 1900).

Head free, testaceous, finely spotted with black. Pronotum small, rounded, produced posteriorly, testaceous, with large and small black spots intermixed. Tegmina clouded testaceous and chestnut, with an interrupted black line along the radial vein, that line fading away posteriorly. Supra-anal lamina ♀ bilobed.

Total length 48 mm; body 36 mm; pronotum 8×10 mm; tegmina 40 mm.



Fig. 5. *Epilampra angusta*, n. sp. $1\frac{1}{2} \times$.

This form approaches *E. inclarata*, Walker, from Sarawak in size ¹⁾, it is, however, of a much narrower built. Resembling by its small pronotum *Rhabdoblatta parvicollis* Walker, from Sarawak, it differs from it by its mottled tegmina, and still more, by the tegmina and wings being rounded, not truncated. The tegmina of *R. parvicollis*, the type of which is also in the O. U. M., are light chestnut, with a few large pale blotches. A second specimen in the O. U. M., also from Sarawak (Mount Matang, June 1907), has the tegmina uniform light chestnut.

***Epilampra gjellerupi* n. sp.**

1 ♀, New Guinea (Gjellerup, 1911).

Head free. Pronotum testaceous, with larger & smaller brown dots intermixed. Tegmina pale testaceous, translucent, with (about) five large irregular dark-brown spots arranged along the distal two-thirds of the radial vein.

Total length 23 mm; body 18 mm; pronotum 5×6 mm; tegmina 20 mm.

Only three species of *Epilampra* seem so far to have been recorded from New Guinea, viz. *E. keraudrenii*, Le Guillou, *E. fervida*, Walker, & *E. papua*, Saussure. Of these *E. keraudrenii* is considerably larger than the present species, viz. about 40 mm. in total length, and resembles *E. lurida*, Burmeister, from the Malay region, in its colouring. *E. fervida*, Walker, is, according to Shelford, synonymous with *E. plana*, Walker, the types of which are in O. U. M. They are of about the same size as *E. gjellerupi*, but the former is very pale testaceous and only slightly mottled, whilst the latter is much darker and heavily mottled with chestnut brown. Neither of them shows the large spots so characteristic of *E. gjellerupi*. Nearest to it is probably *E. papua*, Saussure ²⁾, which is only slightly larger and the tegmina of which the author describes as provided with "punctis majoribus 4—6 in venâ principali". However, the dimensions of its pronotum (viz. 5.5×9 mm.) differ greatly from those of *E. gjellerupi* (viz. 5×6 mm.), and the illustration which, curiously enough, shows no trace of the large spots described by Saussure, little resembles our species.



Fig. 6. *Epilampra gjellerupi*, n. sp. 2×.

***Rhicnoda rugosa*, BRUNNER VON WATTENWYL.**

1 ♂ Meloewoeng, Tjilatjap, M. Java.

1 ♂ Borneo (1912); 1 ♀ N. Borneo (MOHARI, 1912).

Several specimens in spirit, Edam, Bay of Batavia (DAMMERMAN, Nov. 1919).

¹⁾ The measurements of the type ♀ of *E. inclarata* WALKER in the O. U. M. are total length 50 mm; body 35 mm; pronotum 10×13 mm; tegmina 40 mm.

²⁾ Revue Suisse Zool. Vol. III, p. 361, pl. IX, fig. 14 (1895).

Distribution: Pegu; Tenasserim; Malay Peninsula; Sumatra; Borneo; Java; Halmahera.

Subfamily BLATTINAE.

Platyzosteria denini, n. sp.

1 ♂, Ceram, Wahai (DENIN, August 1919).

Shining black. Supra-anal lamina orange, with three black blotches at its anterior, and two at its posterior margin. Posterior margins of the 1st, 2nd, & 3rd abdominal tergites smooth; minutely spined in the 4th, more so and gradually increasing in the 5th, 6th, & 7th tergites. Tegmina scale-like. Wings absent. Supra-anal lamina (♂) rounded, 3 mm. in length, 6 mm. in width, with a small crescent-shaped piece excised at its posterior margin. Posterior tarsi, cerci & styles missing.

Total length 36 mm; pronotum 10.5×17 mm; tegmina 5 mm. in length, 9 mm. in width at the base.

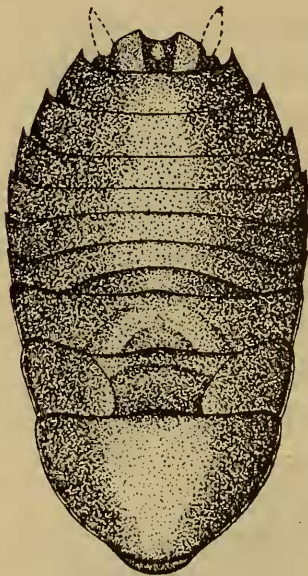


Fig. 7. *Platyzosteria denini*, n. sp. $1\frac{1}{2} \times$.

Its general black colour with orange markings gives this species a superficial resemblance to *P. bicolor*, Kirby, from the Torres Straits; however, this latter species has only two orange spots, viz. one at either side of the 7th abdominal tergite.

The genus *Platyzosteria*, Brunner, is chiefly Australian, though a few species have been recorded from the Austro-Malayan (New Guinea) subregion, and even from the Oriental region. The widest range has *P. soror*, Brunner, which occurs in Singapore, Formosa, Borneo, the Austro-Malayan, Melanesian and Polynesian islands. *P. coxalis*, Walker, came from Bombay. ¹⁾ Besides *P. soror*, the following species occur within the Austro-Malayan sub-region: *P. bicolor*, Kirby, from the Torres Straits; *P. variolosa*, Bolivar, from New Caledonia; *P. biloba*, Saussure, from Amboina, and *P. liturata*, Saussure, from New Georgia & the Solomon Islands. None of them seem so far to have been recorded from Ceram.

I have been able to compare *P. denini* with the first three of these species, viz. *P. soror*, *P. bicolor*, & *P. variolosa*. They are all considerably smaller than *P. denini*. In addition, *P. soror* is black, with orange margins to pro-, meso-, & meta-notum; *P. bicolor*, as mentioned above, is black, with an orange spot on either side of the 7th abdominal tergite; *P. variolosa* is entirely black. For the two remaining species I have had to rely

¹⁾ Shelford, in Gen. Ins., fasc. 109, p. 5, also records *P. analis*, Saussure, from Bombay, besides from N. S. Wales & W. Australia. I have not been able to trace his authority for Bombay.

upon de Saussure's figures and descriptions. *P. biloba*¹⁾ is small, 10 mm. in length; it is entirely black, with the exception of the last joint of the tarsi and the tips of the cerci and styles which are rufous; finally *P. liturata*²⁾ is also considerably smaller than *P. denini*, viz. 20 mm. in length, and the lateral borders of the body have broad yellow margins.

Cutilia nitida, BRUNNER VON WATTENWYL.

1 ♂, New Guinea (TER POORTEN).

1 ♂, 3 ♀♀, North New Guinea (GJELLERUP, 1911).

1 ♀, Ceram Wahai (DENIN, August 1919).

1 ♀, Java.

The specimens from New Guinea and Ceram are of the normal character and do not require any special remarks. It is otherwise with the ♀ from Java. Brunner³⁾ gives the following dimensions for the ♀: body 24—32 mm; pronotum, length 7.8—9 mm; pronotum, width 12—16 mm. The largest specimen (♂) in the O.U.M., from the Shortland Islands, Solomon Archipelago, measures: body 31 mm; pronotum, length 10 mm; pronotum, width 16 mm. The specimen from Java (♀) is 31.5 mm. in length, thus agreeing with the highest record, but its pronotum, measuring 11 × 20 mm., is considerably larger than in the other described specimens. Its identification, however, cannot be definitely settled, as both posterior metatarsi are missing and an important specific character is thus lost.

Distribution: Malay Archipelago; Formosa; Amboina; New Guinea; New South Wales.

Scabina horrida, n. sp.

1 ♂, North Borneo (MOHARI, 1912).

Body dark castaneous to black, shining. Antennae, anterior and median tarsi rufous. (Posterior tarsi missing). Head covered. Antennae longer than the body. Pronotum parabolic, posteriorly truncated, very shining. Scutellum not exposed. Tegmina quadrate, corneous, laterally reaching to the hinder margin of the metanotum, centrally receding. Wings rudimentary, squamiform, very slightly projecting beyond the tegmina. Posterior angles

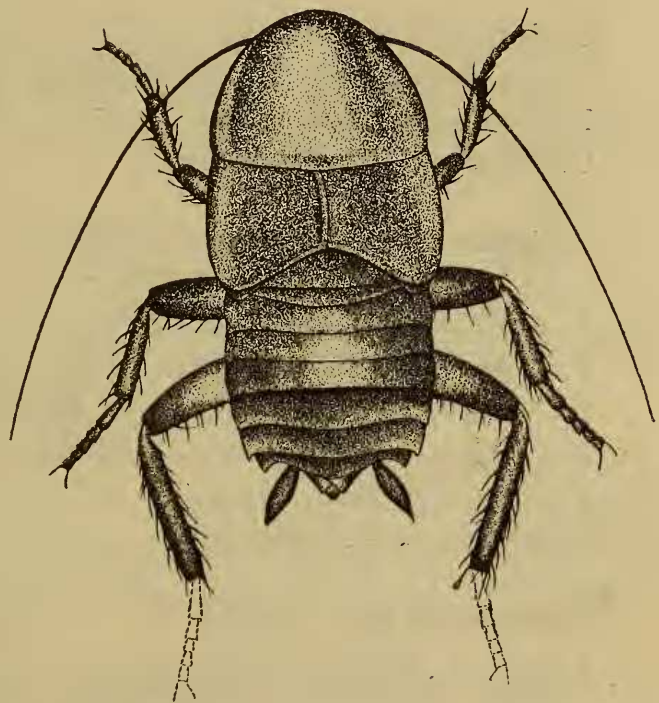


Fig. 8. *Scabina horrida*, n. sp. 2×.

¹⁾ Mém. Soc. Sc. Phys. Nat. Genève, Vol. XX, p. 258, pl. III, fig. 20 (1869).

²⁾ loc. cit., Vol. XXIII, p. 103, pl. X, fig. 36 (1873).

³⁾ Syst. Blatt. p. 214 (1865).

of the abdominal tergites produced backwards, slightly so in the anterior, strongly in the posterior tergites. Cerci long, broad, flattened. Styles long, stout, pointed. Legs heavily spined. Femoral spines in two rows; lower row of front femora with about 15 spines; spines of mid femora longer, but less closely set; those of the hind femora longest.

Total length (♂) 25 mm; pronotum 7.5×11 mm; tegmina 7 mm; cerci 5 mm.

The genus *Scabina* was established by Shelford ¹⁾ for *Pelmatosilpha* (?) *antipoda*, Kirby, ²⁾ from Queensland. The O. U. M. has two specimens (♂ and ♀) of that species, from Tambourine Mt., S. Queensland, 2000', presented by Dr. A. ELAND SHAW. The present species differs from *S. antipoda* by the edges of the pronotum not being turned up, by the scutellum not being exposed, by the femora being much more heavily spined and the cerci considerably longer.

This genus had not before been recorded from the Malayan sub-region.

Blatta orientalis, L.

1 ♂, 1 ♀, Tjibodas, Java, 1500 metres (Aug. 1920).

2 ♀♀ Krakatau (DAMMERMAN, April 1920).

♂♂ and ♀♀, in spirit, Krakatau (DAMMERMAN, April 1920).

3 ♂♂, 1 ♀, New Guinea (TER POORTEN).

2 ♂♂, 1 ♀, New Guinea (GJELLERUP, 1911).

Distribution: Cosmopolitan.

Periplaneta americana, L.

3 ♂♂, Buitenzorg (KARNY, Aug. & Oct. 1920).

1 ♀ without locality label.

Distribution: Cosmopolitan.

Periplaneta australasiae, FABRICIUS.

1 ♂, 2 ♀♀, Buitenzorg (1920).

1 ♂, Pelaboean ratoe, W. Java.

1 ♀, Krakatau (DAMMERMAN, Dec. 1919).

1 ♂, (larva), Balik Papan, East Borneo.

1 ♂, New Guinea (TER POORTEN).

1 ♀, (larva), New Guinea.

Distribution: Cosmopolitan.

Periplaneta lata, HERBST.

1 ♂, 1 ♀, Borneo (1912).

Though described as long ago as 1786 (Fuessly Archiv, Vols. VII & VIII, p. 185), this species does not seem to have been recorded yet from outside Borneo. The O. U. M. has a series of 13 specimens, all from Kuching, Sarawak. The dimensions of the present specimens are:

¹⁾ Trans. Entom. Soc., London, 1909, p. 305.

²⁾ A. M. N. H. (7), Vol. XII, p. 376 (1903).

	♂	♀
total length	32 mm.	38 mm.
body	27.5 mm.	32 mm.
pronotum	9 × 12 mm.	10 × 13.5 mm.
tegmina	25 mm.	28 mm.

***Periplaneta truncata*, KRAUSS.**

4 ♀♀, West Coast of Sumatra (1915).

An immature specimen without locality label, apparently belongs to the same species.

This form differs from *P. americana*, L., by its darker chestnut tint, by the pronotum being almost uniform in colour, and by the tegmina only slightly exceeding the abdomen.

Total length (♀) 31 mm.; body 28 mm.; pronotum 9 × 12 mm.; tegmina 24 mm.

Originally described by KRAUSS from Teneriffe, Brazil and New Britain, REHN recorded this species from Batu Sangkar, Padangsche Bovenlanden, Sumatra. Though now again recorded from Sumatra, it is curious that it has not yet been taken on the Malay Peninsula. The O. U. M. has specimens from Phuc Son (Annam) and Ecuador.

***Stylopyga rhombifolia*, STOLL.**

2 ♂♂, 2 ♀♀ Buitenzorg (KARNY, 1920).

1 ♀ Pionierbivak, Mamberano, North New Guinea (March 1919).

The last of these specimens is unusually large. Body 30 mm; pronotum 8 × 11 mm.

Distribution: Cosmopolitan.

***Stylopyga picea*, BRUNNER VON WATTENWYL.**

1 ♂, 2 ♀♀, Verlaten Island, Sunda Straits (DAMMERMAN, April 1920).

2 ♀♀, Krakatau (DAMMERMAN, April and June 1920).

One of the latter specimens with egg case.

BRUNNER described this species first from the Nicobars, and later on from Baram, Borneo ¹⁾. REHN recorded it from Trang, Lower Siam; SHELFORD collected it in Kuching, Sarawak (specimens in the O. U. M.), and I took it in the Botanic Gardens, Singapore, from under dead tree trunks (specimens now in the Raffles Museum).

The specimens of the present collection are somewhat larger than Brunner's type, viz.

body (♀) 30 mm; pronotum 11 × 12 mm; tegmina 5 mm; against Brunner's: body (♀) 25 mm; pronotum 7.5 × 9 mm; tegmina 3.5 mm.

Distribution: Nicobars; Lower Siam; Singapore; Borneo; Verlaten Island; Krakatau.

¹⁾ Abh. Senck. Naturf. Ges., Vol. XXIV, p. 195 (1898).

Homalosilpha ustulata, BURMEISTER.

1 ♂ Java.

1 ♀ North Borneo (MOHARI, 1912).

1 ♂, 1 ♀ without locality label.

The O. U. M. has several specimens each from Java, from Sarawak (SHELFORD), from Kalim Bungo, Nias (R. MITSCHKE, 1896), and one example from the Philippines (WALLACE). I took this species once only on the Malay Peninsula (Bukit Kutu, Selangor, April 1915).

Distribution: Malay Peninsula, Sumatra, Nias, Java, Borneo, Philippines.

Catara rugosicollis, BRUNNER VON WATTENWYL.

1 ♂, Java.

1 ♀, Tjibodas, Java.

3 ♀♀, Borneo.

The place of origin of the type (♂) was given by BRUNNER doubtfully as "Java?" Both ♂♂ and ♀♀ gave since repeatedly been recorded from Java, and also from the Malay Peninsula, Singapore, Sumatra and Borneo. The O. U. M. has a long series from Sarawak.

BRUNNER gave the following dimensions: ♂: body 15 mm; tegmina 22 mm; pronotum 3.7×5 mm. This is exceeded by the largest ♂ in the O. U. M., from Sarawak: body 19 mm; tegmina 27 mm; pronotum 7.5×8 mm.

The ♀ shows similar variation in size, Saussure ¹⁾ who described this species under the name of *Archibiatta valvularia*, from Java, gave the following dimensions: body 20 mm; pronotum 4.7×7.3 mm. The largest ♀ in the O. U. M., from Sarawak, measures: body 23.5 mm; pronotum 8×12 mm; and this is exceeded by the largest ♀, from Borneo, in the present collection, viz. body 25.5 mm, pronotum 9×12 mm.

The two sexes show a striking difference, the ♂ being slender, delicate and long-winged, the ♀ short, stout and entirely apterous. The ♂ was sufficiently described by BRUNNER. The ♀ may be characterised as follows:

♀. Entirely apterous. Dull black, with the exception of the eyes which are light brown. Head covered. Pronotum parabolic, lateral margins raised and posteriorly produced into heavy spines, its surface corrugated, deeply pitted with dots. Mesonotum and metanotum also deeply pitted, but less corrugated. Abdominal tergites uneven, not pitted, their posterior margins granulated. All femora entirely unarmed. Anterior tibiae along their inner aspect covered with a dense brush-like mass of rused-coloured hair; beyond this brush, towards the upper aspect of the tibiae, a few (about 5) spines; median and posterior tibiae with two rows of about 4 spines each.

In smaller, i.e. probably younger, specimens we find distinct spines instead of the granulation along the posterior margins of the abdominal

¹⁾ Mém. Soc. Genève, Vol. XXIII, p. 118, pl. X, fig. 40 (1873).

tergites. They are specially pronounced in a specimen, 20 mm. in length, in the O. U. M., from Sarawak (Wallace). The burrowing habit of this species probably causes the spines to be worn away in older specimens.

The brush on the anterior tibiae of the ♀ seems to have escaped the notice of former observers. It is not found in the ♂, or only represented by a few scattered fluff-like hairs. Mr. HAMM has suggested to me that the brush may be of use to the ♀ for cleaning itself, and this seems a likely explanation. The insect is of a burrowing habit, but the work of burrowing is probably entirely done by the ♀ which, being apterous and having a stout body and a thick chitinous skin, appears much better adapted to it than the long-winged, slender-legged and altogether frail-looking ♂. A brush would thus not be required by the ♂, but would be very necessary to the ♀.

Subfamily PANCHLORINAE.

Leucophaea surinamensis, L.

Numerous specimens (♂♂ and ♀♀) from Batavia; Edam, Purmerend and Hoorn, Bay of Batavia; Buitenzorg; Tjibodas, Java; Krakatau; Verlaten Island; Balik Papan, East Borneo; New Guinea.

Distribution: Cosmopolitan.

Leucophaea nigra, BRUNNER VON WATTENWYL.

1 ♀, without locality label.

The O. U. M. contains three specimens of this species, viz. one each from Java, the "Burr collection", and "East Indies?"

Distribution: Burma; Sumatra; Java.

Subfamily CORYDIINÆ.

Holocompsa debilis, WALKER.

1 (sex?) Buitenzorg (1920).

1 (sex?) Buitenzorg (KARNY 1920).

1 (sex?) Buitenzorg (SIEBERS, 1920).

The O. U. M. contains, besides WALKER's type, from Sawarak (Wallace), another specimen from Kuching (Sawarak Museum, 1905); one from Prince of Wales' Island (i. e. Penang); one from Kandy, Ceylon (Dr. G. B. LONGSTAFF, 1908). This species had previously been recorded from Sawarak only.

Distribution: Ceylon; Penang; Java; Borneo.

Dyscologamia cesticulata, SAUSSURE.

1 ♀, without locality label.

The specimen in question is slightly larger than SAUSSURE's type (♀) from Singapore, viz. body 26 mm; pronotum 9.5 × 15 mm; tegmina 22 mm., against 25 mm., 8.8 × 14.25 mm., and 17.6 mm., respectively.

In all species of *Dyscologamia* there is a great difference between the males and females. The general outline of the ♂ is elongated, the body is depressed, the pronotum transversely oval, the tegmina long and much surpassing the abdomen.

In the ♀ the outline is oval, shield-like, the body is elevated, the pronotum semi-orbicular, postero-laterally drawn out into angles, the tegmina shorter than the abdomen or only slightly exceeding it.

The O. U. M. has a ♂, from Sadong, Sawarak (J. H. GRANSTONE), and a ♀, from Malacca (CASTELNAU, 1862). The dimensions of the ♂ are: total length 33 mm; body 24 mm; pronotum 8.5×13 mm; tegmina 29 mm.

Distribution: Lower Siam; Malay Peninsula; Singapore; Borneo.

Subfamily OXYHALOINAE.

Diploptera dytiscoides, SERVILLE.

1 ♂, without locality label.

SERVILLE's type came from Australia, and BRUNNER recorded the species from Burma and Tahiti. The O. U. M. has specimens from Honolulu (Blackburn), Buru (Mouhot), Sarawak (Wallace), Manila, and Ceylon (Thwaites, 1872). I recorded this species from Fort Canning, Singapore (Feb. 1915), and later took both ♂ and ♀ on Gunong Kledang, Perak (Nov. 1916). Though widely distributed, this form seems to be nowhere common.

Distribution: Ceylon; Burma; Malay Peninsula; Singapore; Sarawak; Philippines; Buru; Australia; Honolulu; Tahiti.

Subfamily PERISPHAERINAE.

Paranauphoeta rufipes, BRUNNER VON WATTENWYL.

Paranauphoeta rufipes, Brunner. Syst. Blatt. p. 400 (1865).

Nauphoeta discoidalis, Walker. Cat. Blatt. B. M., p. 39. (1868)

Paranauphoeta rufipes, var. *Novae Guineae*, Bolivar. Act. Soc. Españ. 1898, p. 138.

The collection contains 6 mature & one immature specimen from New Guinea, viz.

1 ♀, New Guinea (TER POORTEN).

1 ♂, 2 ♀♀, New Guinea (GJELLERUP, 1911).

1 ♀, West Berau Streek, Mac Cluer Golf.

1 ♂, Tami River, Bivak Hoesin, Humboldt Bay.

BRUNNER's type came from Ternate, but the specimens collected by WALLACE and described by WALKER were from New Guinea, Aru, Dorey, Batchian and Waigiou, and from all of these localities there are representatives in the O. U. M. An example of *P. rufipes* var. *Novae Guineae*, Bolivar, from the Astrolabe Mountains, presented to the O. U. M. by the Brussels Natural History Museum, seems to differ from the others merely by being of a paler, washed-out colour.

Distribution: Ternate; Waigiou; Aru; Dorey; Batchian; New Guinea.

Perisphaeria armadillo, SERVILLE.

1 ♀ Hoorn, Bay of Batavia (DAMMERMAN, March 1920) (in spirit).

1 ♀ Edam, Bay of Batavia (DAMMERMAN, Nov. 1919) (in spirit).

1 ♀, Klein Kombuis, Java Sea (DAMMERMAN, Nov. 1920).

The type of this species came from Java. There are in the O. U. M. specimens from Singapore, Amboina, Aru and New Guinea, all collected by Wallace; I took it on Bukit Kutu, Selangor (April 1915), and on Gunong Kledang, Perak (Nov. 1916).

Perisphaeria glomeriformis, LUCAS.

1 ♀, Digoel District, New Guinea (DUMAS, Sept. 1909).

This is the first record of this species from New Guinea, it having previously been known only from the Malay Peninsula, Cochin China and the Philippines. Both specimens (♀♀) in the O. U. M. are from the latter islands.

The specimen in question is somewhat larger than Lucas's type, viz. 21 mm. in length, and 13 mm. in width, against 16 mm. and 9.5 mm. respectively.

Pseudoglomeris flavicornis, BURMEISTER.

1 ♂, and 5 ♀♀, Buitenzorg (April 1920).

1 ♀ Idjen Plateau, East Java, 1800 metres (April 1920).

1 ♀ Borneo (1912).

The specimen ♀ from Borneo, which constitutes a new record as to locality, is unusually large, viz. body 24 mm; pronotum 8.5×12 mm; against the average of 16 mm. for the body, and 5×7.5 mm. for the pronotum. Its colour, however, is normal, viz. body black; antennae, palps, tarsi and cerci orange. Burmeister's description of "tibiis testaceis" is evidently an error for "tarsis testaceis."

Originally described from Java, this species was recorded by Annandale from Rámanád, S. India, and by Bolivar, though doubtfully, from Trichinopoly, Madras Presidency. The O. U. M. has specimens from Bombay, Madras, Sylhet, Mouhot and Assam.

Distribution: India; Assam; Java; Borneo.

Subfamiy PANESTHINAE.**Salganea morio, BURMEISTER.**

1 ♂, Java (KEUCHENIUS).

1 ♀, Bantam, N. W. Java (May 1914).

1 ♀, Borneo.

3 ♀♀, without locality label.

A larval form, labelled "New Guinea, Gjellerup, 1915", with the crenulation of the lateral borders of the 7th abdominal segment obscure, is doubtfully included under this species.

Distribution: Ceylon; Malay Peninsula; Sumatra; Java; Borneo; Formosa (KARNY); Amboina; New Guinea (?).

Panesthia javanica, SERVILLE.

- 1 ♂, Malabar, Bandoeng, Java (OUWENS, April 1906).
 1 ♀, Poentjak, Mt. Gedeh, W. Java, 1500 metres (1915).
 1 ♂, North Borneo (MOHARI, 1912).
 2 ♀♀, without locality label.

Distribution; Burma; Cambodia; Lower Siam; Malay Peninsula; Sumatra; Java; Borneo; Philippines; Christmas Island.

Panesthia saussurii, STÅL.

- 1 ♂, Korintji, Sumatra, 1500 metres (BÜNNEMEYER, June 1920).
 1 ♂, Poentjak, Mt. Gedeh, W. Java (March 1915).
 1 ♀, Tengger, E. Java, 1800 metres (H. DOCTERS VAN LEEUWEN, Nov. 1920).
 1 ♂, North Borneo (Mohari, 1912).
 1 ♀, Ceram (ENGELS, 1915).
 5 ♂♂, 2 ♀♀, New Guinea (GJELLERUP, 1911).
 1 ♀, New Guinea (TER POORTEN); 1 ♀ S. New Guinea.
 2 ♂♂, 2 ♀♀, without locality label.

I had inadvertently omitted this species from the list in my "Malayan Blattidae". It has a wide distribution, similar to that of *P. javanica*. The O. U. M. has specimens from Selangor (H. C. Pratt), Borneo (M. Burr), Sarawak (Shelford), Java, the Philippines, Dutch New Guinea (H. C. Pratt) and New South Wales (J. J. Walker). It has also been recorded from Formosa, by KARNY. To these localities can now be added Sumatra and Ceram.

Variation in the number of spines of the anterior femora of *Panesthia*.

STÅL¹⁾, in his definition of *P. saussurii*, mentions the varying number of spines on the anterior femora (viz. "femora antica variant inermes, vel spinis duabus vel una armata"), and KARNY²⁾ confirms Stal's observation and points out that the number of spines can be of no value for the purpose of identification, though SAUSSURE³⁾ had used that character in his keys of classification. KARNY further states that frequently the number of spines may differ between the right and left anterior femora, and also that specimens with three or four spines occur. In the collection from the Buitenzorg Museum, comprising 17 examples of *P. saussurii*, the spines vary from nil to five in number; in 12 specimens the spines are equal on the two femora; in 4 specimens those of the right are more numerous, whilst in no case those of the left preponderate (In the specimen from Sumatra both fore legs are missing). The O. U. M. has a series of 19 specimens, with the spines varying from one to five.

¹⁾ Oefv. Vet. Akad. Förh. Vol. XXXIV (10), p. 37. (1877).

²⁾ Supplementa Entomologica, No. IV, p. 90. (1915).

³⁾ Rev. Suisse Zool., Vol. III, p. 312 (1895).

In 9 specimens the spines are equal on the two sides; in 7 cases those of the right preponderate, and in 3 cases those of the left. I obtained similar results by examining the series of 37 specimens of *P. javanica* in the O. U. M. The spines varied from nil to five; in 25 cases they were equal on the two sides; in 9 cases those of the right preponderated, and in only three cases those of the left. An examination of other species of *Panesthia* brought the same result: the spines are never constant in number; in most cases they are equal on the two femora; if they are unequal, then those of the right more often preponderate than those of the left. The following tables give particulars, the first column indicating the locality, the second the Collector's name, and the third and fourth the number of spines on the left and right anterior femora respectively.

***Panesthia saussurii*, STÅL.**

(Buitenzorg Museum collection).

		L.	R.
Korintji, Sumatra	BÜNNEMEYER	(damaged)	
Poentjak, W. Java	?	4	4
Tengger, E. Java.	H. DOCTERS VAN LEEUWEN	4	4
N. Borneo.	MOHARI	4	4
Ceram.	ENGELS	0	0
New Guinea	GJELLERUP	0	1
do.	do.	3	3
do.	do.	3	3
do.	do.	3	3
do.	do.	3	4
do.	do.	4	5
do.	TER POORTEN	3	3
do.	Collector?	2	2
locality?	?	4	4
?	?	2	3
?	?	4	4
?	?	3	3

***Panesthia saussurii*, STÅL.**

(Oxford University Museum collection).

		L.	R.
Selangor	H. C. PRATT.	3	3
do.	do.	3	3
do.	do.	3	3
do.	do.	3	2
Borneo	M. BURR.	3	4

Borneo	SHELFORD.	3	4
do.	do.	4	4
do.	do.	4	5
Java	Collector?	4	3
do.	?	2	3
do.	?	5	5
Philippines	?	3	3
do.	?	2	3
Dutch New Guinea	H. C. PRATT.	3	4
do.	do.	3	4
do.	do.	4	3
New S. Wales	J. J. WALKER.	1	1
do.	do.	2	2
do.	do.	2	2

Panesthia javanica, SERVILLE.

(O. U. M. collection).

		L.	R.
Ceylon	G. B. LONGSTAFF.	1	1
do.	do.	1	1
do.	do.	1	2
do.	do.	2	1
do.	do.	0	2
Penang	coll.?	3	3
Selangor	H. C. PRATT.	3	3
do.	do.	3	3
do.	do.	3	4
do.	do.	4	4
Pahang	V. J. BELL.	2	3
Sumatra	BECCARI.	4	4
do.	do.	4	4
Nias	MITSCHE	3	2
do.	do.	3	3
do.	do.	3	3
do.	do.	3	3
Borneo	DIBY	3	3
do.	WALLACE	3	5
Sarawak, Borneo.	do.	3	3
do.	SHELFORD	3	3
do.	do.	3	3
do.	do.	3	4
do.	do.	3	4

Pontianak, Borneo.	V. D. POLL.	3	3
do.	do.	3	3
do.	do.	3	3
Java	coll.?	3	3
do.	?	3	3
do.	?	3	3
do.	?	3	3
do.	?	3	3
do.	WALLACE	3	4
Philippines	coll.?	2	3
loc.?	A. MELLY.	5	3

***Panesthia angustipennis*, ILLIGER.**
(O. U. M. collection).

		L.	R.
Singapore	WALLACE		(damaged).
Pondicherry	M. BURR	4	3
loc.?	do.	3	3
?	do.	3	5
?	do.	3	5
?	do.	4	4

***Panesthia plagiata*, WALKER.**
(O. U. M. collection).

		L.	R.
Ceylon	TEMPLETON	1	1
do.	do.	1	1
do.	do.	1	1
do.	E. E. GREEN	0	0
do.	do.	0	0
Kandy, Ceylon.	coll.?	1	1
do.	?	1	1
do.	?	1	2

***Panesthia regalis*, WALKER.**
(O. U. M. collection).

		L.	R.
India	W. W. SAUNDERS.	0	0
Silhet	coll.?	0	0
loc.?	?	0	0
Bhutan	OBERTHÜR	0	0
do.	do.	2	2
Tauta (?)	M. BURR	0	3

Panesthia mandarinea, SAUSSURE.

(O. U. M. collection)

		L.	R.
Borneo	WALLACE	0	0
Singapore	HORSLEY	0	1

Panesthia biglumis, SAUSSURE.

(O. U. M. collection).

		L.	R.
Philippines	coll.?	(broken)	0

Panesthia flavipennis, WOOD-MASON.

(O. U. M. collection).

		L.	R.
Naga Hills	coll.?	0	0

The above tables, comprising 92 specimens of eight different species of *Panesthia*, show that in 60 cases the number of species on the two anterior femora was equal, that in 25 cases the spines on the right femora preponderated, and only in 7 those of left.

An examination of 17 examples of a closely allied form, *Salganea morio*, Burmeister, partly from the Buitenzorg collection and partly from the O. U. M., led, curiously enough to quite different results. Though the number of spines varied here within the same limits, viz. from nil to five, they were in six cases equal on the two anterior femora; in six those of the right preponderated and in five those of the left. They were therefore as equally distributed as possible.

ASYMMETRY IN BLATTIDAE.

We may take it as established that variation in the number of spines in the anterior femora of *Panesthia* is of common occurrence; that the number may vary even between the right and the left side of the same individual, and that it is generally the left side in which the number of spines is reduced.

With the tegmina of Blattidae asymmetry is, of course, the rule. In by far the greater number of species the two tegmina cross each other thus that the left tegmen covers a portion of the right, and the covered portion is then always of a less firm texture and of a different, duller colour. No doubt, it is of advantage to these insects that their flat and soft body should be protected by a double layer. However, in a few instances the tegmina meet in a straight line, without crossing each other (*Diploptera*, *Euthyr-rapha*, *Aphlebia*, *Hypnorna*).

Asymmetry in the wings has apparently not been recorded yet. One would expect it not to be uncommon in organs which lie directly below habitually asymmetrical structures, the tegmina, the venation of which they repeat in their general features. That it does occur, is shown by the case of *Phyllodromia diagrammatica* which I described above (see p. 198). The difference in the branching of the radial and ulnar veins there would, if observed in different specimens, certainly be regarded as of specific value, and the condition of the median vein which is simple on the one side, and bifurcated on the other, perhaps even as of generic value!

Further, we meet with asymmetry in the tarsus. The tarsus is normally composed of 5 joints, but one of them is frequently suppressed. Brisout de Barneville ¹⁾ enumerates ten species of Blattidae in which he observed 4 joints only in the one or the other of the tarsi. Those species were, in modern nomenclature: Nyctiborinae: *Nyctibora limbata*, Thunb., and *N. tomentosa*, Serv.; Blattinae: *Periplaneta americana*, L., and *Homalosilpha ustulata*, Burm; Panchlorinae: *Leucophaea surinamensis*, L., and *Nauphoeta cinerea*, Oliv.; Blaberinae: *Blabera atropos*, Stoll, and *Monachoda grossa*, Thunb.; Corydinae: *Polyphaga aegyptiaca*, L; Panesthinae: *Panetshia javanica*, Serv. — BRUNNER VON WATTENWYL ²⁾ confirms de Barneville's observation, but adds that the reduction most frequently takes place in the left foot, whilst the right foot has retained the normal number of joints (certain species of *Nyctibora*, *Epilampra* etc.).

Asymmetry in the case of the supra-anal lamina is rare, but two instances may be quoted. In *Anisopygia*, Saussure (subfam. Phyllodromiinae), from Guatemala, the supra-anal lamina of the ♂ is divided almost to the base into two unequal lobes. (See Saussure ³⁾ and Shelford ⁴⁾). And in *Theganopteryx nitida*, Borg (subfam. Ectobinae), from Kamerun, that lamina is very asymmetrical, its posterior angles being produced as two incurved hooks, the right overlapping the left ⁵⁾.

In the subgenital lamina of the ♂ asymmetry is exceedingly common. It has been observed in all subfamilies, with the exception of the Blattinae and the Panesthinae, and it frequently happens that within the same genus some species show a symmetrical, others an asymmetrical subgenital lamina. The following genera may serve as examples, though the list is probably by no means exhaustive:

Subfam. ECTOBINAE: *Hemithyrsocera*; *Theganopteryx*; *Anaplecta*; *Escala*; *Mallotoblatta*;

Subfam. PHYLLODROMIINAE: *Phyllodromia*; *Ischnoptera*; *Pseudothyrsocera*; *Piroblatta*; *Liosilpha*; *Anisopygia*; *Ceratinoptera*; *Paraloboptera*;

¹⁾. Annales Soc. entom. France (2), Vol. VI (1848), Bulletin, p. XIX.

²⁾. Système des Blattaires, p. 13 (1865).

³⁾. Saussure, Soc. entom. Zürich, Vol. VIII, p. 57 (1893).

⁴⁾. Shelford, Genera Insectorum, Phyllodromiinae, p. 21 (1908).

⁵⁾. Shelford, Trans. Entom. Soc., London 1912, p. 649.

Subfam. NYCTOBORINAE: all genera, viz. *Nyctibora*; *Eunyctibora*; *Paratropes*; *Heminyctibora*; *Megaloblatta*;

Subfam. EPILAMPRINAE: *Epilampra*; *Pinaconota*; *Notolampra*; *Eustegasta*;

Subfam. PANCHLORINAE: *Paranauphoeta*; *Zetobora*; *Gyna*; *Pro-nauphoeta*;

Subfam. BLABERINAE: *Blabera*;

Subfam. CORYDINAE: *Polyphaga*; *Cardax*;

Subfam. OXYHALOINAE: *Paraplecta*; *Anareolaria*;

Subfam. PERISPHAERINAE: *Pseudoglomeris*; *Cyrtotria*; *Karnyia*.

Since the subgenital lamina of the ♂ is so commonly asymmetrical, we naturally expect this to be the case with the styles too. BRUNNER ¹⁾ merely says that an abortion of the right style is very frequent (*Phyllo-dromia*, *Temnopteryx* etc.), and that a notch takes the place of the style which has been suppressed. But to give a few additional particulars: the suppression may be entire or partial. In *Theganopteryx lucida*, BRUNNER, *Ischnoptera basalis*, GERST., *Anacompsa cucullata*, SHELF., *Paraplecta aethiopica*, SHELF., the left style is well developed, whilst the right has disappeared altogether. In other cases the left style is merely stouter than the right, as in *Theganopteryx gambiensis*, SHELF., *T. notata*, SHELF., *Hemithyrsocera massuae*, S. & Z., *H. circumcincta*, R. & F., *Pseudothyrsocera bicolor*, SHELF., *Phyllodromia picturata*, SHELF., and *Pirolatta Allu-audi*, SHELF. But there are also instances where the right style is well developed, and the left has disappeared, as in *Zetobora lata*, SHELF., and *Eustegasta variegata*, SHELF. Or the right style may be only stouter than the left, as in *Ischnoptera bimaculata*, GERST., and *Hemithyrsocera ridleyi*, SHELF.

Such asymmetry, affecting so many different structures in the Blattidae, is surely not approached, much less equalled, in any other Insects. To account for it, one is in the first line, of course, tempted to regard it as the result of the left tegmen crossing the right, with a subsequent stronger development of the former, and a corresponding reductions of the other organs of the left half of the body, as e. g. the smaller number of spines in the left anterior femora of *Panesthia*, and the fewer tarsal joints in the left feet of so many species. Unfortunately the fact that the right style of the ♂ is more frequently suppressed than the left does not fit in this theory. If we could prove that in those forms where the tegmina are symmetrical, i. e. where they meet in a straight line without crossing each other (*Diploptera*, *Euthyrrapha*, *Aphlebia*, *Hypnorna*), the other organs of the body have remained symmetrical too, such a theory would receive a welcome support.

¹⁾ loc. cit. p. 15.

Postscriptum. I regret that only after having written the above lines I came across a paper on asymmetry in the elytra of fossil Cockroaches by Fernand Meunier, viz:

“L’asymétrie fréquente des élytres de Blattidae du terrain houiller de Commeny (Allier) et la phylogénie des groupes”, in *Comptes rendus hebdomadaires des Séances de l’Académie des Sciences*, Vol. CLVI, pp. 493—496 (1913).

The author states that asymmetry is common amongst fossil *Protoblattinae*, *Mylacrinae* and *Blattinae*, all of which represent a very archaic type. However, the asymmetry is only a secondary one. It does not modify the disposition of the subcostal, radial, median, cubital and anal veins which invariably show great constancy in structure. It is otherwise with the branches which arise from these principal veins. They always present appreciable modifications. For instance, the number of venules springing from the subcostal may be unequal in the two elytra, i. e. there may be 8 venules in the left elytron, and 10 in the right, or vice versâ. Similar variations may take place in the venules coming from the other sectors (radial, median, cubital), and also in the anal field.

In conclusion the author warns against the habit of establishing new genera and new species founded upon a single elytron only.

Oxford, February 1922.
